The Citrus Industry
EXCLUSIVE SPECIALIZED CITRUS PUBLICATION
Issued Monthly
Representative of every interest
Representing no special interest

Publication office at Bartow, Florida. Entered as second class matter February 16th, 1920, at the post office at Tampa, Florida, under the act of March 3, 1879. Entered as second class matter June 19, 1933, at the post office at Bartow, Florida, under act of March 3, 1879.

Research Work Demonstrates Health And Nutritional Value Of Citrus

By N. F. Lavigne

While it is axiomatic that people buy and eat the things they like, instead of things which are good for them, the healthfulness of Florida citrus fruits is not being overlooked by the Florida Citrus Commission in its advertising and other contacts with the consuming public. In fact, healthful qualities will be stressed more and more in the coming weeks, particularly during the period of winter weather in the North.

Research is underway at present on several phases of the medicinal value of citrus, sponsored by the commission, and whatever scientific facts are revealed will be effectively utilized. World-famous institutions are cooperating in this research program, including Columbia University, the University of Maryland and the National Bureau of Standards of the United States Department of Commerce at Washington. This research will establish more conclusively the value of citrus fruits for better health, and whatever findings result will be co-related with broader investigations being made by the medical profession generally.

In its research work, the commission has obtained the services of eminent scientists, whose findings will be accepted without question. Among these are Prof. H. C. Sherman, head of the department of chemistry at Columbia University, and active in research on vitamins and mineral elements in nutrition; Prof. Arthur W. Thomas, head of the chemistry department of Columbia University's college of pharmacy, and an authority on food analysis and technology; Dr. Soloman Farley Acree, principal chemist and section chief of the National Bureau of Standards; Dr. L. H. James, head of the bacteriology department at the University of Maryland; Dr. Harold F. Pierce, research physcian and former associate professor at Johns Hopkins University, and Dr S. V. Mead, dental authority and author of many standard dental works.

The citrus commission already has sponsored a small booklet, inexpensively printed for wide distribution, which gives in non-technical language some of the health qualities of citrus fruit. This booklet is entitled "How to Keep Healthy—and Like It," and has been passed upon by the commission's scientific advisory board. It tells of the mineral and vitamin content in oranges, grapefruit and tangerines, and emphasizes the absolute necessity of a proper supply of these elements in the maintenance of bodily well-being. These booklets are being distributed in numerous ways, and will do much to carry the message of citrus health to thousands of people.

One interesting fact brought out in the new booklet is the essential part played by mineral salts in maintaining an "alkaline balance" of the blood. It emphasizes that citrus fruits are a good source of such mineral salts as calcium, potassium and iron, and when citrus fruits are eaten. these elements are stored in body tissues, to be drawn upon when needed to overcome an "acid-condition." Just how much acid or alkali is found in the tissues at any one time depends on what has been consumed as food. Colds, loss of sleep or fatigue tend to produce an acid condition, and alkali must be drawn from the bodily stores to restore a normal balance.

The vitamin content of citrus fruits also is stressed, the little booklet pointing out that oranges contain so much Vitamin C that orange juice was selected as a standard by which to measure the amount of this vitamin in other foods. Any food which contains even half as much Vitamin C as oranges has a high rating. Life could not be sustained without this particular element, as wounds would never heal and teeth and bones would never get strong and sound.

Some animals produce their own supply of Vitamin C within their bodies, but human beings must get it from outside sources. An interesting fact brought out is the origination of the nickname "Limey" as applied to British seamen. More than 150 years ago, these seamen were ordered to take a given quantity of "lime," really sour Spanish orange

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Boron In Citrus Nutrition In Florida . . .

By DR. A. F. CAMP
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Considerable attention has been called to the possibility of using borax or other compounds containing boron, in citrus fertilizers. Since so much stress has been put on this in the last few months it seemed wise to review briefly the situation with regard to the use of this element in citrus in order that growers and others may be as fully informed as possible. The interest has been aroused in part by the recommendation of boron for celery and in part by the publications on boron deficiency by Haas and Klotz of California and Morris of South Rhodesia.

While boron deficiency was first described by Haas and Klotz (1) of the Citrus Experiment Station in California, their work was limited entirely to water and sand culture work under laboratory conditions. Boron deficiency does not occur in the field in California, as far as anyone has been able to determine, but boron injury has been a constant problem there for several years due chiefly to the presence of boron in the irrigation waters (2). This injury has been widespread and has been extremely costly not only because of the injury of the trees themselves but also because of the cost of searching for new water supplies low in boron and the diversion of supplies carrying too much boron. In some cases it has been necessary to divert streams feeding impounded waters so as to prevent excessive contamination of the water supply with boron. No boron compounds have been suggested for use in the fertilization of citrus in California, while a great deal of money has been lost due to boron toxicity.

The first identification of a deficiency of boron in citrus in the field was made in Southern Rhodesia by Morris in 1936 (3) (4). At that time he reported that the raised corky veins described by Haas and Klotz as typical of boron deficiency did not occur in the field but that other symptoms were typical. These included a hardening of the pulp resulting in a low juice content, a thickening of the peel with the occurrence of resinous areas, a failure of the seed to develop properly and the presence of gum around the partially developed seed. These characteristics resulted in the common name for the deficiency, i. e., "hard fruit." The trees died back, according to their description, much as zinc deficient trees do and the leaves showed light translucent spots or specks. Haas has reported recently that he has been able to produce the same symptoms as those mentioned above under laboratory conditions.

The work of Morris and others on boron in Africa indicated treatments as high as one pound per tree without injury and with recovery from the symptoms of the deficiency. The treatments were on oranges, however, which are much less susceptible to boron toxicity than grapefruit, at least under Florida conditions. It should be remembered also that the applications were made under a condition of boron deficiency which would allow for larger amounts being applied before a level of toxicity would be reached.

Boron Toxicity In Florida

The earliest reports of boron toxicity in Florida, as far as the writer can determine, came during the World War in connection with the use of potash salts which contained excessive amounts of borax. The writer was not in the state at the time but has been informed by older growers that the damage, then known commonly as muriate damage, was identical with boron toxicity as it occurs at present. Following this experience care was taken by manufacturers to remove excess boron from fertilizer materials and boron toxicity as it is observed today arises from other causes. Considerable of the toxicity has been observed during the last few years resulting from the following causes: Dumping of borax solution from tanks in packing houses around trees, dumping of culls that have been treated with borax and not washed, leaving boxes which have borax on them in groves during a rainy period, and attempts to use borax as a fertilizer. Severe toxicity caused by all of the above has been noted in a number of instances and the extent of the damage has varied all the way from the death of the trees down to a scattering of affected leaves. A few other causes have also been observed such as the use of household cleansers containing borax in wash waters which were dumped around the trees, the use of celery fertilizers containing borax on yard trees, and the dumping of sweepings from packing houses using borax in their fruit processing.

The first evidence of borax injury is the development of very intense yellow to orange areas around the edges and tips of the leaves. The backs of the leaves are slightly roughened in the yellow areas due to small raised dots or pox. Dead areas will sometimes develop in the edges of the leaves and eventually such leaves will shed at the petiole. Where relatively large amounts of borax have been added there will be a sudden shedding of leaves so that the tree may become almost defoliated. If the weather is at all favorable, a new growth will start almost immediately and may be almost white gradually turning to yellow; these leaves then shedding and another new growth starting. The tree will die back gradually and the leaves will become smaller and rounder than normal. They will be light colored with dead areas in the edges and the excrescences on the backs of the leaves will be dark and heavy. If applications of borax are persisted in the tree will finally die but even in relatively mild cases the heavy loss of foliage will usually result in the loss of one or two and sometimes three crops of fruit.

If the amount of borax was not too large the tree will gradually recover until only a few leaves show light yellow areas which might be mistaken by a casual observer for six-spotted mite injury. The under sides of these spots will show the typical roughening, however, and the toxicity can be identified definitely by this even when the distribution of the light areas might closely resemble six-spotted mite injury.

The difficulty in treating trees for boron injury from any of the above

causes lies in the act that by the time the condition is discovered the trees have already absorbed a large amount of boron and while leaching with water on an acid soil or even the application of lime might be expected to reduce the amount of available borax, the fact remains that the damage has already been done and the tree contains entirely too much boron so that such treatments are only palliatives which will in some cases help hasten recovery. In general, where irrigation water is available, leaching with large amounts of water seems to give the best results. Sufficient lime to tie up the boron will usually bring on excessive amounts of frenching and manganese deficiency as the trees recover and so make the situation as bad if not worse than it was before.

Borax injury can usually be diagnosed at the present time by the yellow leaves with the pocking on the back more easily than by any other symptom but sometimes the second growth comes out a yellowish white with a leaf pattern somewhat similar to that in zinc deficiency although the leaves are not narrowed. In such cases it is frequently mistaken for frenching and treated with zinc sprays. Usually it shows up in a small patch of trees where culls have been left and such a limited distribution is uncommon in zinc deficiency so that this is an additional factor in identification.

In experiments extending over the last several years a slight but definite boron toxicity has been produced on grapefruit on Norfolk soils with two ounces of borax in several different experiments. The injury produced was not of the type to cause shedding of leaves but only produced light yellow areas in the leaves. Since only 10 to 20 percent of the leaves were affected, noticeable defoliaton did not exist. Larger amounts running up to eight ounces produced proportionately more damage and eight ounces frequently produced very severe damage. On marl soils more borax was required to produce injury as might be expected, but with grapefruit definite injury was produced with eight ounces of borax. This experiment was started on the East Coast in 1937 on trees believed to be deficient in boron and four ounces produced very slight toxicity. Complete defoliation was produced on young trees by the use of one pound of borax and two pounds or more almost invariably produced complete defoliation in a relatively short time. During the summer 12 to 20 days were required to produce definite symptoms, and in the winter when the trees were more dormant, periods up to 60 days were required.

Oranges seemed more tolerant to boron than grapefruit and in only one experiment, in Lee county, was definite injury produced on oranges by two ounces of borax. However, some injury was produced in all cases with six to eight ounces on Norfolk soils although not to the extent of that produced on grapefruit. Generally all the evidence seems to indicate that oranges will withstand considerebly more boron than grapefruit and be less affected by the toxicity over a period of time than will grapefruit. In none of the cases mentioned above was there any improvement in condition of the trees produced by the smaller applications that could definitely be traced to the use of boron.

The general asusmption by workers in the field has been that boron deficiency would show up primarily on heavily limed soils and that its toxicity would be less there. However, even on such soils, grapefruit evidently has a very low boron requirement and the use of excess amounts is likely to be dangerous.

Boron Deficiency

The raised corky veins on the leaves, as reported by Haas and Klotz as symptoms of boron deficiency, have been observed for many years in Florida and experiments have been carried on in groves showing this characteristic for several years. So far no satisfactory results have been obtained from the use of borax on such trees although in a number of instances these corky veins disappeared when the trees were liberally supplied with manganese and magnesium, it being associated in these cases with severe bronzing. In 1937, a few trees were found to be affected with symptoms more nearly like those reported by the Rhodesian workers and borax treatments were attempted. These trees were located on marl soil on the East Coast but toxicity resulted from the application of eight ounces of borax per tree and slight leaf spotting from four ounces. All of the trees in the grove produced normal fruit in 1938 regardless of treatment but show some fruit like that described by Morris this year. Even the trees treated with eight ounces of borax in 1937 show this condition. The writer subsequently made a trip with a citrus worker from South Africa but was unable to locate any satisfactory material that seemed to give clear-cut evidence of boron deficiency.

In the spring of 1938 several groves on the East Coast showed fruit symptoms typical of the material reported on by Morris in South Rhodesia and the trees began to die back and to show evidence of a very definite boron deficiency. In one grove about 50 percent of the fruit showed either a total lack of seed development or a partial lack and the fruit had hard spots in the rind and shed heavily. This grove had been under observation for several years previously and this was the first time that this sort of thing had been noticed. It is believed that these symptoms are in all probability boron deficiency although this cannot be stated with any degree of certainty until the plots put in there during the late summer and fall have a chance to put on a spring growth and a new crop of fruit. The situation is complicated by the fact that all of the trees may show recovery regardless of treatment as the June bloom fruit was quite normal and many of the trees have put on a vigorous growth although a part of them still show defoliated twigs in the top and a general debilitated condition. A number of other groves show the same symptoms but in markedly less degree and in some of these groves these symptoms had not been observed formerly. It is quite possible that the present condition was brought on primarily by the very severe drouth and there is some evidence also that the heavy use of

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Cold Storage Versus Tree Storage Of Valencia Oranges

Some Points To Be Considered In Storage Of Valencias

BY C. O. BRATLEY
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Crops and Diseases

Valencia oranges may be left on the tree until quite late in the spring but usually after March they decrease markedly in quality. The fruit begins to regreen and the juice sacs near the stem end of the fruit lose moisture, becoming woody and granular. These changes are more pronounced in fruit grown on rough lemon stock than on that grown on other commonly used stocks. This regreening is more difficult to remove by ethylene treatment than the green in early season fruits. Since the orange is considered to be of prime eating quality at the time these changes begin, if some way was found to keep it in this condition for a month or two, the marketing season of finest quality fruit could be lengthened accordingly. Cold storage seems to be the most promising method for this purpose. However, there are several factors which must be taken into account in deciding whether to pick and store the fruit or hold it on the tree.

Results given here for the purpose of bringing out various points to be considered in this connection are from two carloads shipped from Davenport, Florida, in March and May 1936, respectively. Oranges from half of the trees in three neighboring plots were picked on March 19; and after receiving washing, disinfecting, and waxing treatments they were packed and shipped by rail under ventilation the following day. Recording thermometers placed among the fruits in boxes at various locations in the car gave an average temperature of 60 degrees F. during the transit period. On arrival at New York City the fruit was placed in cold storage at 32 degrees and 90 percent relative humidity.

Eight boxes of 150 size fruit containing strictly comparable samples of oranges had been selected at the packing house and marked for test purposes. On arrival at New York some of these were placed in a cold storage room often used commercially for storing citrus fruits on the market, which was held at 39 degrees F. and 85 percent relative humidity; the remainder was held in the 32 degree room with the commercial consignment. At 2-week intervals 5 or 6 representative boxes from the commercial consignment were examined for pitting and decay. At the same time 35 fruits from each of the two test lots were removed to the laboratory where the juice was extracted and tested for flavor, percentage of acid, and percentage of total soluble solids.

On the dates when storage samples were removed, 35 representative fruits were taken from the unpicked trees in the grove and similar data on the juice were obtained. On May 19 the fruit remaining on the trees in the grove was picked. It was handled and shipped similarly to the previous lot except that it was transferred from a ventilated freight car at Jacksonville to a refrigerated steamship. On arrival in New York City this lot was sold on the auction together with the lot from storage. Two test boxes of the late picked fruit were placed in the storage at 32 degrees F. and examined periodically with the other test fruit. One of these boxes was removed on June 25 and the other on July 27. Final records were taken on the test boxes from the first picking on June 25.

Spoilage

As shown in table 1, the amount of decay which occurred in the early and late picked fruit while stored at 32 degrees F. was of no commercial importance.

The percentage of decay while held at 39 degrees F. was much greater and by the end of 8 weeks would have adversely affected the selling price. Decay found at the first two inspections was mostly blue mold rot but at the 14-week inspection half was stem-end rot of the Phomopsis type. The most important factor affecting the condition of the fruit during the first 8 weeks of storage was pitting and this increased considerably with longer storage periods. Some of the pits were so small that they had little effect on the attractiveness of the fruit, yet many were of sufficient size to detract from the appearance. Fruit stored at 39 degrees showed slightly less pitting than that at 32 degrees. As used here the term "pitting" refers to areas in the skin of the fruit that

Table 1. Spoilage in Valencia oranges stored at 32 degrees and 39 degrees F.

Stored at 32 degrees F.				Stored at 39 degrees F.	
Storage period Weeks	Subsequent holding period (at rm. temp.) Days	Fruit decayed Percent	Fruit pitted Percent	Fruit decayed Percent	Fruit pitted Percent
		Fruit picked March 19			
8	0	1.0	22	3.0	16
8	7	2.7	34	16.0	18
10	0	0.0	28	5.0	27
10	8	8.0	46	39.0	24
12	0	0.0	45	14.0	42
12	7	18.2	50	56.0	34
14	0	1.4	39		
14	7	19.8	57		
		Fruit picked May 19			
5	0	0.7	3		
5	7	0.9	11		
10	0	0.0	5		
10	7	1.8	19		

have become sunken and often slightly discolored. Typical pits near the stem end of two fruits are shown in figure one. In taking data, pits were recorded only if at least 5 oil vesicles were involved.

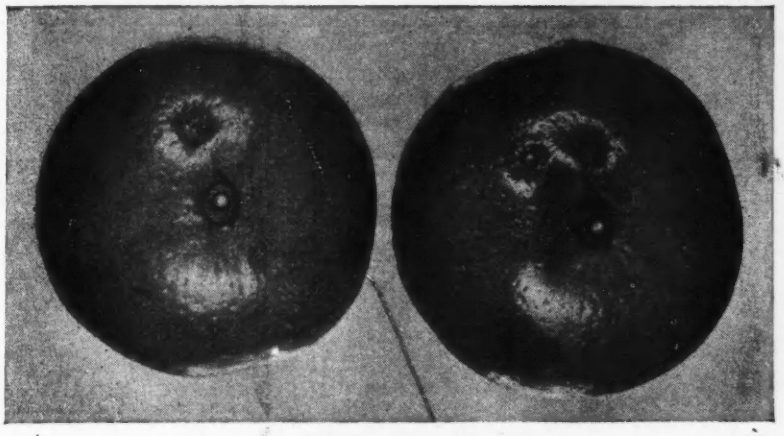

Figure 1. Pitting on Valencia oranges.

Following each examination, the test boxes from storage were placed at room temperature, and after a week a second inspection was made. Pitting and decay increased markedly during this holding period and were greater in amount after the longer storage periods. In fruit previously held at 39 degrees F. decay at the end of a week at room temperature was usually 5 to 7 times as great as when removed from storage. In fruit stored at 32 degrees the amount of decay which occurred during the additional week increased greatly with the longer storage periods, being 6 times as great in fruit after 12 weeks in storage as in fruit after 8 weeks in storage. These figures which are also shown in table 1 represent the maximum spoilage that might have been expected by the retailer and consumer if the fruit had passed through the regular market channels. Late-picked fruit kept better than the earlier picked fruit, for after 5 and 10 weeks in storage only 1 and 2 percent decay, respectively, occurred during the week at the then prevailing summer temperatures.

Changes in Composition of Juice

During the two months when the earlier-picked fruit was in transit and storage its percentage of total acid dropped from 1.15 to 0.9 while the total soluble solids (mostly sugar) remained almost the same. This caused a slight increase in the solids-acid ratio. On the other hand, the fruit that remained on the tree during that period decreased in acid from 1.15 percent to about 0.9 percent, and increased in total soluble solids from 11.4 to about 12.7. This change caused a marked increase in the solids-acid ratio. In figure 2 these changes for both lots of fruit are shown by the solid lines. Similar information for the fruit of the second picking during the storage period of 10 weeks is shown by the dotted lines.

It was usually impossible to obtain unanimity of opinion as to the palatability of a sample of juice. Some tasters preferred acid juice, others preferred sweet juice with but little acid. Fruits from the tree and from storage were sampled periodically for flavor by several tasters and were found to maintain good palatability throughout the test. Even those fruits picked May 19 had good flavor when removed from cold storage on July 27. Most of the New York tasters preferred the sweeter fruit of the second picking to that of the first picking; but in Florida the tasters regarded the fruit of the second picking as somewhat insipid because of its lack of acidity. With the stored fruit it was found that if 2 percent or more of the surface of the fruit was pitted, the juice usually had an off flavor. Palatability of the fruit held at 39 degrees F. was considered but slightly inferior to that of fruit stored at32 de-

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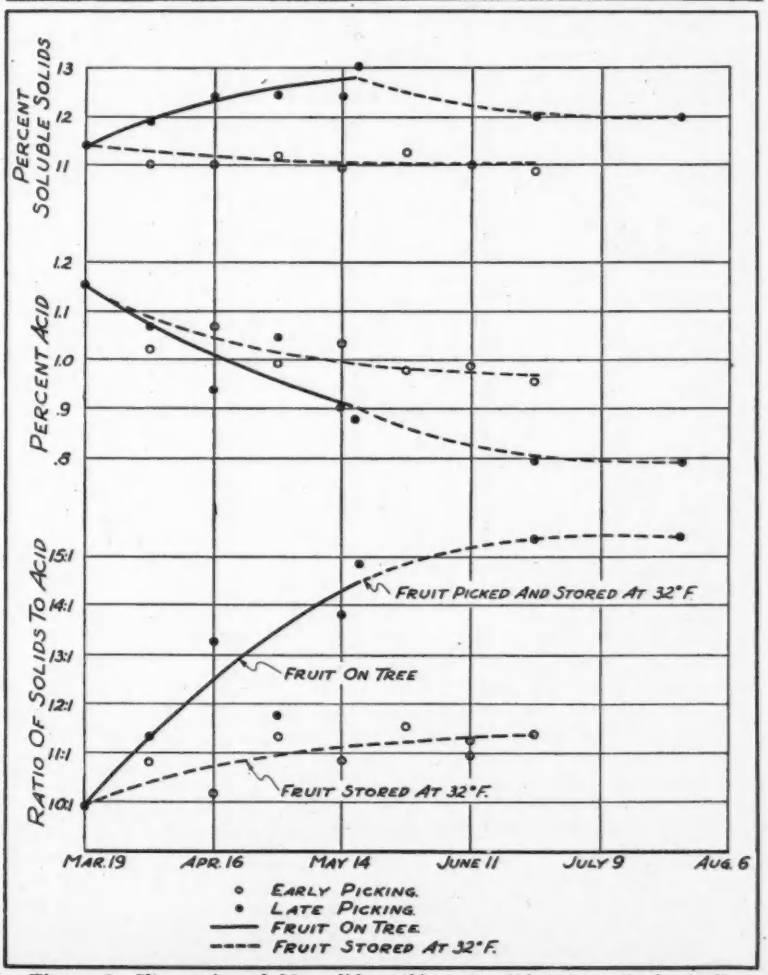

Figure 2. Change in soluble solids, acid, and solids-acid ratio in fruit on the tree compared with fruit in cold storage.

The Citrus Industry

with which is merged The Citrus Leaf
Exclusive publication of the Citrus Growers and Shippers

Publication office 550 North Broadway, Bartow, Florida
Telephone ——— 289

Published Monthly by
ASSOCIATED PUBLICATIONS CORPORATION
S. L. FRISBIE - - - - - - - President
S. LLOYD FRISBIE - - - - - Secretary-Treasurer
A. G. MANN - - - - - - - Production Manager

Subscription, $1.00 per year in advance

IS THIS THE ANSWER?

The past month has witnessed several important developments in the citrus program—developments which should mean much to the growers of citrus fruits.

First, a "state of emergency" in the grapefruit deal was declared by Governor Cone and Commissioner of Agriculture Mayo. By virtue of this authority, and acting under a provision of the Florida law, the Florida Citrus Commission established a minimum price of 32 cents per box on the tree as the average cost of production. Under the provisions of the law any purchase or contract of purchase at a lower price would be declared invalid, and the license of the purchaser would be revoked.

Second, at a conference of citrus leaders of Florida and Texas held in Lakeland, the Texans agreed to increase the price of cannery grade grapefruit from $3.50 per ton to $5.25 per ton. It was generally agreed that the Florida price of 32 cents per box was equivalent to $7.50 per ton, but owing to a differential in freight rates and the higher juice content of the Florida fruit, it was held that the Texas canneries were entitled to this difference in price. Most Florida canners had closed their plants when the Flordia minimum price of 32 cents was established, feeling that they could not compete with Texas canners who were paying but $3.50 per ton. With the adjustment of the price differential, it is expected that the Florid acanneries will resume operations.

Third, the proposed marketing agreement submitted by Florida growers, establishing limitations on grade and size, was formally approved by the United States Department of Agriculture, and as this issue of The Citrus Industry goes to press the agreement is being voted upon by the growers and shippers of the state. Its early adoption is anticipated.

Fourth, the Federal government through the department of agriculture, has entered the field for the purchase of surplus fruit under a program by which the seller agrees to divert from trade channels an amount of fruit of third grade equal to the amount purchased by the government for distribution among the nation's needy.

Fifth, the campaigns being carried on by the retail food distributors and by the Florida Jaycees, and the hotel men's offerings of a large glass of orange or grapefruit juice for a nickle are now under way, and each apparently is having a stimulating effect upon the consumption of citrus products.

Each of these developments should, and doubtless will have an immediate and stimulating effect upon the price of citrus fruits. Combined, they should aid materially in the disposition of the present record-breaking crop at prices which will at least equal the cost of production.

The declaration of a "state of emergency" in the grapefruit deal and the establishment of a minimum price should enable growers to at least keep out of the "red" for the remainder of the season. The approval of a marketing agreement (which now appears to be assured) should further aid in establishing at least a semblance of orderly marketing. The purchase of fruit by the government and the diversion of an equal amount to other channels, should help. The various sales campaigns should aid in the disposal of considerable quantities of fruit.

But each of these developments has to do with the immediate future; with the disposal of the present crop. So the question arises, will any or all of them have a lasting effect upon the industry—an effect which will be felt next year or in the years to come?

We are inclined to agree with the statement of W. H. Mouser before the citrus commission, that all of these steps are mere stop-gaps taken to meet a temporary emergency, and that what the industry needs is a long-range program embracing the three major citrus production regions, Florida, Texas and California-Arizona, working together toward one common end—the increased consumption of citrus fruits, accompanied by an aggressive sales and advertising campaign sponsored by the three sections.

This publication has long believed in and consistently advocated a closer affiliation between the growers of the three producing areas. The successful culmination of the conference between the growers of Texas and Florida at Lakeland when an agreement was reached on a satisfactory adjustment of grapefruit price differentials, seems to promise that agreement on other matters of common interest to the three sections is among the possibilities.

It has been pretty thoroughly demonstrated that a marketing agreement in Texas or California is of little effect so long as Florida stays out of the fold. It is equally certain that a marketing agreement in Florida would be of little avail if Texas and California were marketing under a less drastic agreement.

Up to the present time, the citrus growers of each producing region have been not only fighting each other but fighting among themselves, to the detriment of all concerned, thinking only of the immediate moment—and apparently not much about that. Isn't it about time we began thinking and planning about the future—a future in which the growers of Florida, Texas, California and Arizona are equally and jointly concerned?

Nature may intervene to bring prosperity to one citrus section and adversity to another, but so far as human efforts are concerned, we are going to get nowhere by pulling against each other. Why not try pulling together, first, here in Florida, and then with our sister producing

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Florida Entomological Conditions In 1938 . . .

By J. R. Watson

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The year just closed, unlike some of the previous years, did not disclose any outbreak of any particularly new insect such as the discovery of the white fringed beetle two years ago.

Taking up first the insects of citrus, the citrus aphid was not especially abundant in the spring of the year although there was considerable curling of the leaves in some groves. At the present time these aphids are very scarce due to the fact that the weather has been dry in most citrus sections and there has been very little new growth on citrus trees.

The Chinese ladybeetle increased in satisfactory numbers in three counties of the state and again gave practically commercial con rol in the regions where it has become established.

Rust mites began to appear in destructive numbers as early as February, due to the fact that the weather was warmer than usual for that month over most of the citrus belt. By April they became very abundant, making control measures necessary. The dry spell in August over considerable of the citrus belt also brought up a heavy infestation of rust mites. The more general use of fungicides probably aggravated this situation but this is a matter that cannot be helped as the campaign to increase the amount of bright fruit going to market must be continued, so it will be necessary for the grower to continue to fight not only fungus diseases but also rust mites.

The purple mite also appeared early in March in rather destructive numbers and in April the 6-spotted mite did much damage to grapefruit.

Whiteflies and scale insects were present in about normal numbers. Much progress was made at the Lake Alfred sub-station towards controlling these and other citrus pests by combination sprays.

Again the pumpkin bugs were not especially destructive in the citrus belt. This is at least partly due to a heavy parasitization by the feather legged fly in the fall of 1937. The parasitization by this same fly was heavy during the past fall so we may reasonably expect there will be no especially heavy outbreak of pumpkin bugs for the coming season. However, in the extreme western part of the state pumpkin bugs were very destructive to truck crops in general, including even ears of corn.

Mealy bugs began to appear on citrus in March, somewhat earlier than usual.

The white fringed beetle was found on a considerable number of new farms the present year but no new counties were found infested in Floridaa. However, in Mississippi, Alabama and Louisiana many new localities were discovered. The bureau of Entomology of the United States Department of Agriculture did very energetic work in fighting these beetles. They have sent a man to South America to discover why this beetle is not particularly destructive in its native home and possibly to bring back parasites which may be discovered there.

Turning to truck crops, the strawberry pamera did its usual amount of damage. Dr. Wilson working at the Strawberry Laboratory, made an intensive study of this insect and found that its spread to strawberries in the spring was due largely to the drying up of its native host plants.

Several light infestations of the pepper weevil were found in Manatee County but there was no commercial damage to the spring crop. However, one pepper field is now heavily infested and practically the entire crop has been destroyed. Again it was demonstrated that the complete destruction of the pepper plants after harvesting in the summer is a very effective way of combatting this pest.

A comparatively new pest which has spread into Florida from the west gulf states, the belted cucumber beetle, did considerable damage in some localities. It was reported that a ten acre field of lima beans was a complete loss. It also seriously injured a field of beans in Pinellas County. This beetle can be distinguished from other cucumber beetles, the striped one and the banded one, by bands running cross wise of the insect.

Mole crickets, especially the Changa, are increasing in most sections of Florida. A new and apparently quite effective bait was an ounce of paris green thoroughly mixed with a can of calo dog food. Although rather expensive this was found to be very practical in dooryard gardens.

The citrus root weevil was bred out on beans in Marion County. This is the first instance where this common pest of citrus in the southern part of Florida and particularly in the West Indies has been found to complete its entire development on an annual crop like beans.

For the first time the West Indian flower thrips, which is widespread but seldom abundant in the southern part of Florida, did commercial damage to beans in Pinellas County. This is a large black thrips which works very much like our common yellow flower thrips. As its name implies, it is extremely abundant throughout the West Indian islands.

For the second time the Mexican bean beetle was discovered in the extreme northern part of Florida, this time in Gadsden County. The The previous discovery was in Monticello County where it apparenty had died out. It is possible that this beetle may gradually adapt itself to Florida climate. In states further north where it has become established it is an extremely severe pest of beans. Bean growers in Florida are to be congratulated upon not having this pest to deal with.

The gladiolus thrips began to appear in the large gladiolus plantations in Manatee County as early as February. They became very abundant in April and May. One large plantation in Lee County was reported to be an entire loss in April. It continued to be abundant on gladiolii until the bulbs were dug in June.

The oleander caterpillar continued to strip the leaves of oleanders from Gainesville south. It was also reported as feedng on figs in St. Augustine.

The sycamore lace bug which al-

(Continued on page 15)

Citrus Crisis M
Productio

The grove owner or manage ro of No. 1 fruit at costs substa lo the past, has opportunity to sa

Calcium Nitrate

(Nitrate Nitrogen and Water Soluble Calcium)

CALCIUM NITRATE is an ideal Spring application to citrus groves.
CALCIUM NITRATE is the only material which provides quick-acting nitrate nitrogen, with water-soluble calcium—two essential plant foods for the price of one.
CALCIUM NITRATE tones up the trees, promotes a vigorous bloom, a heavy set, and uniform maturity.
CALCIUM NITRATE improves quality, too.

MODERNIZE YOUR
FERTILIZER PROGRAM
AND REDUCE
YOUR COST PER BOX

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The use of ou fer enabled citrus gho to prove to the fec NITROPHOSKUM in the product frui lower costs.

The past few nes growth of the pro day this prog the of conservative g cause many o es the State stan tim effectiveness.

An outstanding grou lly are freely at your ser le mation on request . . .

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NITROPHOSKA

TRADE MARK REG. U.S. PAT. OFF

A Rich, Complete Fertilizer

There are ten different analyses of NITROPHOSKA, and grades are available with minor elements in quantities fully meeting recommendations of agricultural authorities.

NITROPHOSKA provides an even and steady supply of nourishing plant foods. NITROPHOSKA users tell you this rich COMPLETE fertilizer is very economical, and will help produce better fruit at lower cost. Much of the earliest fruit in the State is produced with NITROPHOSKA.

FOR BETTER CROPS
AT LOWER COSTS
FOLLOW THE TREND TO
HIGH ANALYSIS

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ate utors **Florida**

Starving Pests In Truck Fields

Vegetables Escape Sickness When Nematodes Cannot Feed

Just a few years ago the young vegetables grown on many fields grew desperately sick from the presence of uncounted little eelworms, known as nematodes. Yields were reduced and farmers suffered losses as a result. Nowadays, however, Florida farmers know how to starve the nematodes before the crops are planted, and give the vegetables a chance to make their growth.

Finding out how to solve the nematodes problem was far from a simple matter. That a solution was found is another tribute to the efficiency and value of research when applied to agriculture. Workers at the Florida Agricultural Experiment Station are entitled to the credit for the discoveries that have meant so much to the producers of important cash crops.

Nematodes occur in many of the sandy soils in Florida and other Southern states. They attack the roots of most vegetable plants, causing swellings, commonly known as root-knot. The nematodes seem to give off poisons which are harmful to the plants, and when the root-knot appears growth and development are checked. Yields are reduced accordingly, or entirely missing.

Soil conditions must be favorable in four respects before nematodes will hatch and get to work. Moisture and temperature have to be suitable, with air and food available. Studies of these facts gave the research men, classified as entomologists, the cue to corrective measures. They learned to supply the right amounts of everything except food, thus starving the nematodes.

Since most Florida truck crops are produced in the fall and winter, the plan was adopted of plowing and cultivating the land at weekly intervals after the vegetables have been harvested in the spring. Air thus was added to the moisture and the warmth supplied by nature. Nematodes eggs hatched, but without plants growing on the land the young eelworms starved.

When the time arrived for the planting of fall crops, the nematodes had passed out of the picture. All was not yet well, nevertheless, since the soil "burned out" in a hurry while it was kept free from vegetable matter. The plant food content was depleted with amazing rapidity. "Something will have to be done about that," the bug men agreed.

Growing crops that are immune from root-knot was the way out of the difficulty that they hit upon. Velvet beans of the bunch kind were used, later **Crotalaria spectabilis** was adopted as even better, in most cases. Both are legumes, and nematodes will attack neither.

Plants other than these are not allowed to grow on the land under treatment, whether of crops or weeds The velvet beans or crotalaria are given cultivation once a week, to keep the soil stirred.

In a single summer most of the nematodes are eliminated. If enough persist to be troublesome the treatment can be repeated the next or some subsequent summer.

With the nematodes out of the way, truck crops again can be planted with impunity. Usually the added output in a single season will offset the expense of the entire treatment.

In the field, practical control also has been developed by another method — through the application of certain fertilizers. Research also uncovered this alternative treatment.

Danger of upsetting the vegetable crop cart no longer is nearly so great as when nematodes were unrestrained. Pleas of the truck crop farmers for relief had a conclusive response from the Experiment Station.

Research again "showed cause" when to put the "acid test."

FLORIDA ENTOMOLOGICAL CONDITIONS IN 1938

(Continued from page 12)

most invariably browns up sycamore trees in the early fall was reported as doing severe damage to sycamore as early as July in Polk County. The camphor red scale was also abundant in July, somewhat earlier than usual.

In pecan insects, the cigar case-bearer did much damage in Okaloosa and Walton Counties in May, eating out the buds and young shoots of pecans. The nut case-bearer and the leaf case-bearer were observed by Mr. Hill of our pecan laboratory at Monticello to be going into hibernation in August and September, and a few even in late July. This was apparently caused by the unreasonably dry weather, making tender growth on pecans scarce, and hence cutting off the food supply. The ability of some insects to go into hibernation when their food supply is cut off is an important factor in enabling them to survive unfavorable periods.

Fuller's rose beetle became abundant on tung oil trees around Alachua County in August, and in November a heavy infestation of cottony cushion scale occurred on these trees in Jefferson County. Except for an occasional attack by grasshoppers or crickets a tung oil tree is usually not much troubled by insects.

Sweet Spiced Kumquats

2 pounds whole kumquats
1 1-2 pounds sugar
1 1-2 pints water
1 cup vinegar
Whole spice

Thoroughly clean well-colored kumquats by scrubbing with brush and scraping with paring knife. Rinse well and drain. Make a slit with a sharp-pointed knife into and across the sections of each kumquat to prevent them from bursting open and so the syrup will penetrate. Boil till tender in an abundance of boiling water. Drain and add to sugar-water-vinegar mixture. Cook briskly till kumquats are clearing and syrup is thickening. Add one stick cinnamon broken, one tablespoon each whole cloves and allspice tied in a bag. Cover and let stand overnight to "plump." Boil again till kumquats are transparent and syrup is thick. Let stand again covered tightly. When cold pack in sterile jars, adding small amount of spice, heat syrup. Pour over fruit, seal and process pints for 15 minutes.

Orange Marshmallow Sauce

1-4 lb. marshmallows
1 orange, juice and grated rind
1 egg white
1-2 cup cream whipped
7-8 cup sugar
1-8 teaspoon cream of tartar
3 tablespoons water

Cut marshmallows up fine and let stand in fruit juice. Place unbeaten egg white, cream of tartar, sugar and water in top of double boiler. While the water boils vigorously underneath, beat with a rotary beater till mixture is white and fluffy. Stir in marshmallows and fruit mixture. Cool and add whipped cream just before serving. This is delicious for puddings.

COLD STORAGE VERSUS TREE STORAGE OF VALECIA ORANGES

(Continued from page 9)

grees.

Comparison of the Two Lots On The Market

As shown in table 2 the percentage of second and third grade fruit and the percentage of large size fruit had increased by the second picking. No record of the number of culls was kept. Even though the late-picked fruit was of lower grade, this change was not as great as had been expected or as might be expected in other years.

templated. It is known that fruit from the same tree may vary in its transit and storage behavior from year to year. Furthermore, growing conditions have a pronounced effect on the rate of change in quality of fruit left on the tree until late in the season. The decision of whether to hold oranges on the trees or pick and hold them in cold storage to some extent must be governed by consideration of all these factors, as well as the general market outlook. Some of these factors cannot be weighed long in advance of picking. At the present time there is no such quick method of predicting the keeping quality of a particular lot of oranges in cold storage as there is for certain other fruits.

Table 2. Comparison of pickings as to grade and size of fruit.

Date picked	First grade Percent	Second grade Percent	Third grade Percent	150-size and over Percent
March 19	46	53	1	56
May 19	29	63	8	64

The two lots were displayed side by side on the pier in New York and were sold in succession at the auction on May 25. Both were in good condition. The freshly-picked fruit was slightly greener around the stem, and coarser in texture. About 10 percent of the 100-size and 5 percent of the 126-size were dry and granular to a depth of one-half inch at the stem end. The fruit from cold storage, though having better color and texture, showed about 4 percent pitting, some brown stain and about 1 percent blue mold rot. The stems were greener and fresher on the stored fruit than on that which was freshly picked.

Size for size the freshly-picked fruit outsold the fruit from storage but because of the greater number of larger sizes in the former, the average selling price for the two lots was almost the same. On March 25, the day the oranges from the first picking would have been sold, had they not been stored, the average price for oranges was $1.03 less than the average on May 25, the day both lots were sold. The total charges for cold storage and for the extra handling entailed were 25 1-2 cents per box. Thus, the gain from storage, after charges were deducted, amounted to 77 1-2 cents per box.

The preceeding results are given neither to encourage nor discourage the cold storage of late season oranges. Rather they are presented to illustrate the points which must be considered if cold storage is contemplated. It is known that fruit from the same tree may vary in its transit and storage behavior from year to year. Furthermore, growing conditions have a pronounced effect on the rate of change in quality of fruit left on the tree until late in the season. The decision of whether to hold oranges on the trees or pick and hold them in cold storage to some extent must be governed by consideration of all these factors, as well as the general market outlook. Some of these factors cannot be weighed long in advance of picking. At the present time there is no such quick method of predicting the keeping quality of a particular lot of oranges in cold storage as there is for certain other fruits.

Before reaching any conclusions as to the general desirability of holding a portion of the Florida Valencia crop in cold storage for late markets it would be advisable to make experimental storage tests for several seasons with representative samples of fruit grown under the various cultural and weather conditions which prevail in Florida. In any case, it might be impossible to make a blanket recommendation for the State as a whole because Valencia oranges are grown under such widely differing conditions in Florida. However, with better knowledge of the factors which affect the keeping quality of oranges in cold storage, shippers could proceed with greater assurance than is now the case.

In the present studies the earlier-picked fruit in storage developed considerable pitting by the end of 2 months and this proved to be the important factor limiting its storage life at 32 degrees F. Pitting was somewhat more extensive on fruit

(Continued on page 22)

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Is your average cost per year for Citrus grove fertilizer more than $20.00 per acre and proportionately less on young trees? If so, a part of your cost is wasted.

Thousands of acres of Citrus Groves are being operated profitably under our recommendations at less than $20.00 per acre per year, FOR FERTILIZER.

Satisfied GROVE OWNERS using our service will tell you of the present excellent condition of the trees, improved production both in quantity and quality at less cost.

See us at our new location at 142 E. Stuart Ave., Lake Wales, Florida.

KEENAN SOIL LABORATORY

ADVERTISEMENT — THE LYONS FERTILIZER CO.

The LYONIZER

Department

COMPILED BY THE LYONS FERTILIZER CO.

Our Field Men Report . . .

Truck farmers in Hardee and DeSoto counties are now preparing for their spring crops. Present indications are that egg plant, pepper, cucumbers and tomatoes will represent the major portion of the plantings.

Mrs. E. Seidel, wife of the late E. S. Seidel of Gotha, died recently in the Orange county general hospital. Both Mr. and Mrs. Seidel were in an automobile accident on Sept. 9th which proved fatal to Mr. Seidel, but it was thought that his wife would recover. The deceased, however, has been ill ever since. She is survived by three sons, E. E. and W. F. Seidel of Harvel, Ill., and Gus Seidel of Gotha.

James Lafayette Dillard of Winter Garden, on December 28th celebrated his 80th birthday by inviting all his friends to come and celebrate the occasion with him.

Speaking of him the Winter Garden Journal said:

"He was born December 28, 1858 in Danville, Va., Pennsylvania County, came to Florida in November 1888 and settled here in Winter Garden long before the site was named. He was one of the boulders of the town, being the first citizen to build a home here after the naming of the town. He has always been a farmer and citrus grower in a great capacity. He has set out over 200 acres of citrus groves; built the first hotel on the site the Griffin Chevrolet Company now stands. He donated the property on which the First Baptist Church now stands."

Open house was held on the occasion from 2:30 in the afternoon until 9:00 o'clock at night.

MANY absurd statements have been made recently about the ultimate end of the citrus industry in Florida. We have heard it said that the entire citrus industry was on the verge of being wiped out, that ruin and bankruptcy faced every grower in Florida, that the market was so over supplied with fruit that it would be generations before the market would be able to absorb the fruit which present trees are producing.

As a matter of fact Florida has on numerous occasions gone through seasons when they were faced with markets which were just as unfavorable as has been the case so far this season. We have gone through freezes which wiped out virtually all our fruit. We have experienced the Mediterranean fruit fly when regulations virtually put an embargo on Florida fruit. These and other disasters have been overcome and the industry has gone ahead with undiminished fortitude.

Likewise in the case of the recent unsatisfactory prices for our fruit, we will overcome that difficulty and proceed along the pathway to progress and prosperity. Indeed, right now we are seeing the effects of the coordinated efforts of the industry in the price "pegging" measures on grapefruit.

The marketing agreement for which virtually every major factor in the citrus industry has been working most earnestly appears now about to become a reality.

The results of these two measures will undoubtedly assure improvement of returns for citrus fruit during the present season.

The citrus industry of Florida is too big an enterprise to be put out of business because of the setbacks of any one season.

Big investors and small ones whose capital is tied up in the citrus industry have too much at stake to permit personal differences of opinion between themselves to long retard the growth and prosperity of that industry.

So in spite of temporary set backs and other disturbances which from time to time affect the citrus industy, we maintain that year in and year out the citrus growers of Florida, as compared to agriculturalists in other lines over the nation, are in a decidedly fortunate position—

W. L. Lyons Jr

ADVERTISEMENT — THE LYONS FERTILIZER CO.

FEBRUARY SUGGESTIONS FOR GROVE CARE

Prepared by the Horticultural Department of The Lyons Fertilizer Company

CULTIVATION

Remove the banks from young trees, after the 15th of the month, and examine carefully for wood lice. Continue light cultivation every ten days while the weather is dry.

PEST CONTROL

Keep a close watch for aphids. Spray for the control of scab on grapefruit and for Thrip and Rust Mite in the bloom.

FERTILIZER

Fertilize young trees and complete spring application of fertilizer on trees that have not already been fertilized.

PRUNING

Pruning can be done now if the new growth is well out. All cuts should be made close to the main trunk or branch from which the dead wood is to be removed. The larger cuts should be smoothed off and covered with paint.

Idle Fancies

Few men want to live after their children have to look after them—or after the children think they have to look after them.

When a miser dies, leaving a fortune, business picks up for the courts and the lawyers.

Blood is thicker than water—although you haven't seen a brother for sixty years, he is a brother still.

And if you are the right kind of brother, you are still ready to fight (or pray) for him.

It makes a lot of difference whether you bump the other fellow's car or whether the other fellow bumps your car.

The "rainbow is just around the corner"—it is up to us to discover it.

LYONS CUSTOMER PLEASED WITH CONDITION OF GROVES

Dr. George W. Clapp, owner of 165 acres of fine groves in Orange County spent the holidays inspecting them and visiting Mr. and Mrs. Eldridge Clapp. Eldridge Clapp is the son of Dr. Clapp, and manager of the groves. Dr. Clapp expressed himself as being very much pleased with the condition of his groves, and the steady improvement we are making in quality as well as production.

When the wife is away, home is just a place to sleep.

Because these Products are Manufactured in Florida for use on Florida Groves

We Recommend

ORANGOL SPRAY EMULSION

OBRITE DUSTING SULPHUR

"SUPERIOR" WETTABLE SULPHUR

For control of citrus insects and disease

Maunfactured by

Orange Manufacturing Company
Orlando, Florida

Lyons Fertilizer Company
Distributors

Little Bits of FUN

Old salt (to fair visitor, who had been out several times with him in his boat): "Bit of a swell today, miss."

Visitor: "Awfully nice of you to say so — but you ought to see me on Sundays."

Father: "Well, Willie, I received a note from your teacher today."

Willie: "Is that so, Pop? Give me a quarter and I won't breathe a word about it to mother."

Mrs. Gab: "So your husband objects to cats."

Mrs. Zero: "Yes, indeed. He says that I feed all the cats in the neighborhood. Won't you stay and have some tea?"

First Student: "I wonder how old Miss Jones is?"

Second Student: "Quite old, I imagine. They say she used to teach Caesar."

"Women don't interest me, I prefer the company of my fellow men."

"I'm broke, too, Brother!"

Doctor: "Have you told Mr. Brown that he's the father of twins?"

Nurse: "Not yet. He's shaving."

Two little boys were bragging about their fathers. Finally, little Billy said, "Why my father is an Eagle, Elk, Moose and a Lion."

"Yeah," said his pal. "What does it cost to see him?"

Prospective employer: "Are you one of those who watch the clock?"

Applicant (with dignity): "No sir! I have a wrist watch."

Magistrate: "How do you know you were going only fifteen miles an hour?"

Defendant: "Why, I was on my way to the dentist's."

BORON IN CITRUS NUTRITION IN FLORIDA

(Continued from page 7)

alkaline irrigation water during the past spring may have made the trouble very much worse. It is entirely possible that these groves will produce normal fruit in the coming year but if they do not, it will be possible to determine definitely from the plots that have already been laid out whether this is a boron deficiency or not. Dr. Haas who visited here recently saw one of the groves and examined a large amount of very severely affected fruit which had been brought to the Experiment Station from another of the groves so affected, and he concurred in the writer's opinion that it fit the description laid down by Morris and also coincided with the material that he had been able to produce in water culture. Until definite results are obtained from the experiments, however, it will not be possible to say definitely that it is boron deficiency.

Those attempting to diagnose the condition above should consider that the dying back of the twigs and general dying back of the trees is in all probability not a specific condition related to boron deficiency as the pictures published by the South Rhodesian workers and also other experiments carried on here indicate that very much the same general type of dying back can be produced by a deficiency of zinc, copper or manganese. The failure of seed to develop, the presence of the dark seed coverings around the central axis and the formation of some gum in this area can in all probability be taken as very definite symptoms although this cannot be proved with certainty until we have had more experimental work. This condition is shown in Figure 2 and those having material that they believe to be of this type can send it to the Citrus Experiment Station for examination if they so desire. One grove in the central part of the state has been found to produce somewhat the same symptoms following very heavy applications of lime including some hydrated lime but the symptoms are not quite as extreme as those found on the East Coast.

At the present time no recommendations on the use of borax are being made by the Experiment Station. A large amount of injury was obtained in the experiments even where the soil was high in lime and where the soil was predominantly marl, indicating the need of caution in the use of this material. This was particularly true in the case of grapefruit. Boron compounds, unlike manganese, magnesium, copper and zinc salts, are very toxic when present in even small excess so that whereas large amounts of the other materials may be used without injury and merely represent an uneconomical practice, a slight excess of boron can cause extreme damage to groves and a loss of one or more crops of fruit. In addition to this there is every indication from the groves that have been under observation that the appearance of the symptoms is related to seasonal conditions. Dry weather might quite possibly reduce the amount of available boron and highly alkaline water might do the same.

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65% MANGANESE SULPHATE

MANGANESE Sulphate (as a spray or included in the formula for your regular fertilizer) has been found to aid in maturing fruit with a deeper NATURAL COLOR and with increased sugar and solids: Tee-Cee Brand 65% Manganese Sulphate (the economical form of Manganese) is available in special Spray Form Grade.

Specify TEE-CEE Brand 65% Manganese Sulphate in Your Regular Fertilizer

If "Manganese Starvation" is threatening your grove, insist that the manufacturers of your regular fertilizers include this valuable mineral corrective in the formula you buy. Tee-Cee Brand 65% Manganese Sulphate gives you most for your money — because it analyzes high percentages of Sulphates of IRON, ZINC, COPPER, MAGNESIUM and CALCIUM in WATER SOLUBLE FORM.

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- 89% Zinc Sulphate
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MILO PERKINS TO HEAD FSCC, MARKETING AGREEMENTS; TAPP RESIGNS

Milo R. Perkins has been elected as resident of the Federal Surplus Commidities Corporation and AAA Associate Administrator in charge of marketing agreement programs, to succeed Jessie W. Tapp who has asked that his resignation from these positions be accepted to permit his udertaking other activities which he has under consideration, the Department of Agriculture has announced.

Mr. Tapp will continue his present duties during the period necessary to acquaint his successor with the general administrative detail of the marketing and surplus removal programs.

Mr. Perkins, a native of Wisconsin who was engaged in business in Texas for several years, came to the Department in 1935 as Assistant to the Secretary of Agriculture.

SEE DeSoto EXPOSITION at TAMPA CLOSES FEB. 18

THE GROWER'S OWN PAGE
(Continued from page 3)

fruit to tell him. Not a grocer in a hundred is aware of a "Citrus Brand List" giving the registered grade of each brand. I talked with two commission men in a town of 40,000 last summer. They did not know the official grades of the brands they bought; they accepted the broker's word and their own judgment of the looks of fruit when they bought. Why all the secrecy about the grades? It directly acts to penalize the good fruit. Just try and buy any No. 1 fruit (if you could recognize it) in any small town in the North. You couldn't at any price. But there would be plenty of No. 3 or even No. 2 fruit for sale at No. 1 prices. Oranges are never advertised as of a grade, but merely as of certain sizes. The good fruit is thus brought down in price parity to No. 3's.

The remedy is simply to require each box to be stamped US No. 1, US No. 2, US No. 3, and to require the same stamp on each fruit. This would at once eliminate practically all the racketeering and gyping (at expense of both grower and consumer) that is common practice all the way from the packer to the retailer. Fruit would then be sold by grade. When No. 3 grade brought less than cost of production, it would pay not to ship them, and an automatic control would function. But No. 1's would retail for more than No. 3's. Under present and proposed marketing agreement, No. 2's would still spoil retail sales of No. 1's.

The lumber business a few years ago also had a chaotic marketing due to mixing of grades. The US grading and stamping of lumber brought it back. For many purposes people prefer buying a second or third grade of a commodity. So long as grade and price are comparable, there would be no serious valid objections to stamping grades on oranges or grapefruit.

Standardization and publication of packing house charges should be decreed. This year I noted a difference of 24 cents a total box charges between two houses a few miles apart on same fruit to same market. Few local growers knew it. The charges are appalling, considering that they amount to several times his production cost per box.

Another point, growers versus shipper. The State Marketing Bureau should get out several standard types of Forms of Sales Contract, giving the grower a few rights. If you ship your fruit on consignment now on merely a verbal contract, a shipper

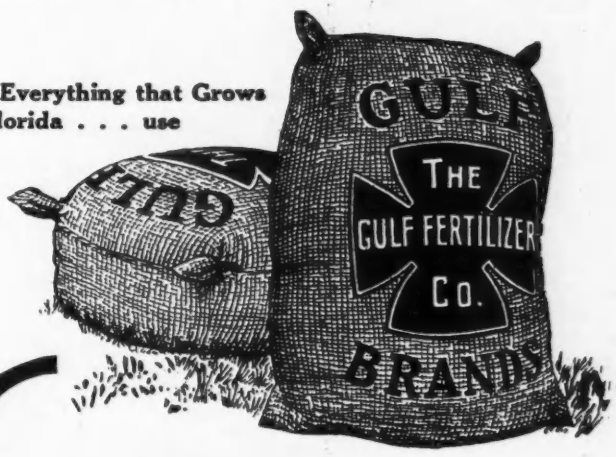
(Continued on page 22)

NEXT..the bloom--
THEN..the "set"--

A CRITICAL TIME FOR YOUR GROVE

• SPRING is "just around the corner." Mother Nature will tell your trees that it's time to wake up and go to work on next year's crop. But trees cannot be expected to add a desirable spring growth, bloom satisfactorily and "set" a crop of fruit unless they have been properly fertilized several weeks in advance of the bloom. Now is the time to have your local GULF Field Man inspect your grove and go over your fertilization program. He will not recommend more than your grove needs — and to supply the balanced plant foods required to maintain your trees in good condition through the summer and fall, you'll find GULF Friendly Fertilizers more economical in the long run.

For Everything that Grows in Florida . . . use



GULF Brands of FERTILIZER

Friendly Fertilizers Keyed to your Soil

THE GULF FERTILIZER COMPANY

To better serve East Coast growers, GULF Brands of Fertilizer are now being manufactured also in the new Gulf factory at Port Everglades, Florida. Write the Gulf factory nearest you for any special information.

Tampa and Port Everglades, Florida

RESEARCH WORK DEMONSTRATE HEALTH, FOOD VALUES OF CITRUS

(Continued from page 5)

juice daily as a preventative of scurvy. The nickname has always remained.

One of the major activities of the commission's scientific research program is the compilation, digestion and publication of known facts about citrus fruits as found in medical literature. This has progressed to the point where existing knowledge is ready for study by the commission's scientific advisory board. When completed, it will mark the first time all existing information on citrus fruits will have been collected into one source for easy reference of doctors and research workers.

Dr. Thomas will continue research carried on for some time on Vitamin C, juice content, solids and ash totals in citrus products from Florida and other areas. In addition, he will delve into the calcium-phosphorus ratio and the carotene content in tangerines. Fruit as it is sold in a Northern market is being utilized in this work.

Just what effect oranges and grapefruit have on oral and dental hygiene is being studied by Doctors Acree and James. It is hoped to establish the local and internal effects on mouth environment, the buffer values of saliva, and the bacteriostatic effect on mouth flora, particularly in caries and "trench mouth."

Another phase of the research program will utilize the cooperation of hospitals and clinics in case studies. Particular attention will be paid to the value of grapefruit as a dietetic aid in preventative work and for convalescents. An elaborate "pH" study also is involved, which may result in many interesting developments.

Most people accept without question the healthfulness of Florida citrus fruits, but many angles of the medical phase have never been explored. It is the commission's hope gradually to uncover these scientific findings, and to use them in broadening the market.

The consuming public buys oranges, grapefruit and tangerines today principally because it likes them—they are pleasing to the taste, but it is felt that a very substantial increase in consumption could easily result if these people were educated to the health values involved and impressed with a realization of the genuine help afforded their bodies in utilizing increased quantities of citrus fruits, as well as satisfying their yearning for something they like to eat. Any claims which the commission makes as to the medicinal value of citrus fruits must, of course, be based on scientific findings, reported by authorities so eminent in their particular field of research that they would not be questioned, and accepted unqualified by the medical profession.

Just when tangible findings will be reported as a result of the scientific research program is problematical. This must of necessity be slow and painstaking work, in order to be complete and authentic, but it is hoped something definite may be announced in the next few weeks. In any event, the work is progressing steadily and when completed will fill in many vacant spots which now exist in medical knowledge of citrus fruits.

Such research is conducted by all large businesses, and is a continuous process. Human knowledge of any product cannot advance beyond existing methods of research technique, but the complete category will be exhausted on citrus fruits if the commission's present plans carry through to completion.

Nature has given Florida a preponderant share of sunshine, the soil and other conditions to grow the finest oranges, grapefruit and tangerines in the world. The commission hopes, through its scientific research program, to place its claims about Florida fruit on a basis of absolute fact, rather than belief. This will take time—it is a big task—but it is moving forward as rapidly as research technique will permit.

Brazil has just established a standard-sized field box which will serve as a basis for the existing trade between citrus fruit growers and commercial exporters. The standard box has the following internal dimensions; length 680 mm; height or depth 350 mm; width 300 mm. The new box is expected to forestall speculation and controversies between citrus fruit growers and exporters.

"Dat's de stuff" says Uncle Natchel.

CHILEAN NITRATE is the only natural nitrate. It is guaranteed 16% nitrogen. And it also contains, in natural blend, small quantities of other plant food elements.

Many of these elements such as iodine, boron, calcium, zinc, copper, iron, manganese and magnesium, in addition to nitrogen, phosphorus and potassium, are necessary to plant life for normal good health, growth, quality and yield.

Therefore, Natural Chilean Nitrate is agriculturally valuable both as a source of nitrate nitrogen, and to furnish, or build up a reserve of other plant food elements naturally blended with it.

Use Natural Chilean Nitrate—take advantage of its quick-acting nitrogen and its many protective elements. It is well-suited to your crops, your soil and your climate.

NATURAL
CHILEAN
NITRATE OF SODA

Among Our Advertisers - - -

KEENAN SOIL LABORATORIES MOVED TO LAKE WALES

Major Edward T. Keenan, of the Keenan Soil Laboratories, announces that in keeping with the general expansion of his business he has moved his offices and laboratory from Frostproof to Lake Wales, where it will be located in the future.

Mr. Keenan stated that the growth of his business had reached a point where it required larger facilities and considerably increased equipment and that while making the change to improved quarters he had decided to move to Lake Wales as being more nearly the center of the scope of his activities.

James Twyman has recently become associated with Mr. Keenan as business manager. Prior to joining the Keenan forces Mr. Twyman was for eleven years treasurer of L. Maxcy, Inc., and before that served in the same capacity for 14 years with Chase & Co.

Both gentlemen state that their program as advertised in The Citrus Industry is meeting with growing approval.

ADVERTISER DISCONTINUES HOUSE ORGAN TO USE THE CITRUS INDUSTRY

The Lyons Fertilizer Company, which for the past five years has issued a house organ under the name of The Lyonizer, last month discontinued publication in its previous form and now are purchasng an additional two pages in The Citrus Industry.

W. L. Waring, president of Lyons Fertilizer Co., states that he has found the coverage of The Citrus Industry so comprehensive that he felt their message carried in this publication would cover a considerably wider field than that of their own list and would serve to enhance the value of their effective advertising they have for years been using on the back page of this publicaton.

The Lyonizer as it appears on the two pages in this magazine is of course the product of the advertiser and is not to be construed as being in any way a part of the editorial content of this publication.

COMMISSION EXPERIMENTS WITH SELLING ORANGES BY WEIGHT

The Citrus Commission is going to undertake in an experimental way the selling of oranges by the pound to see just what the reaction will be. For several years, the industry has considered the advisability of selling oranges by weight, but there are many factors involved, some exceptionally advantageous and others admittedly severe handicaps. Will the consumer accept such a system? Will the retailer cooperate? What effect would general acceptance have on the industry? These are just a few of the questions which must be clearly answered before a general campaign can be started. Habit is a powerful force, and there is some doubt that the housewife could be induced to change her life-long practice of buying by the dozen. The effort will be made, however, in a few isolated spots and the public's reaction closely watched.

IN THERE FROM BELL TO BELL

TO secure quick action, readily-available plant food is used in citrus top-dressers.

Due to delayed application of the summer fertilizer, the spring top-dresser must frequently continue to supply plant food to the trees and to the developing fruit "from bell to bell." Because of its unusual properties, UREA, a water-soluble organic form of nitrogen, furnishes nitrogen to meet these requirements. It goes to work quickly and keeps working.

See that considerable Urea Nitrogen is used in your spring top-dresser. Where nitrogen only is used as a top-dresser, "URAMON" or a "URAMON"-dolomite mixture will give excellent results.

Consult your fertilizer manufacturer or write us.

DU PONT
REG. U. S. PAT. OFF.

"Uramon" Fertilizer Compound
Reg. U.S. Pat. Off.
(42% *Urea Nitrogen*)

• • •

Urea-Ammonia Liquor
(20% *Urea Nitrogen*)
(25% *Ammonia Nitrogen*)

E. I. DU PONT DE NEMOURS & CO., INC., Ammonia Dept., Wilmington, Delaware . . . Orlando, Florida

THE GROWER'S OWN PAGE

(Continued from page 19)

may ship your fruit to Detroit instead of New York — 40 cents more freight per box — sales price the same — same profit to shipper — 40 cents less to you.

Some houses send you a check for net returns on consignment sales, without any confirmatory sales vouchers from point of sale. I believe that a complete history and audit of sale should accompany the returns.

Roadside stands are in need of control. Many of them now sell drops and culls to the tourists going by thus giving them a wrong impression of the quality of Florida fruit and harming the industry as a whole.

Better business is the main need in the citrus industry.

WILL J. PLATTEN

COLD STORAGE VERSUS TREE STORAGE OF VALENCIA ORANGES

(Continued from page 15)

stored at 32 degrees than at 39 degrees, but at the latter temperature decay was serious and became the limiting factor. The late-picked fruit kept remarkably well in cold storage. Its freedom from pitting can be explained, in part at least, by the thicker, coarser peel; but no explanation can be given at present for its freedom from decay.

Wilting or shriveling of the fruit ("aging") was of no importance in the present lots.

Although oranges are rarely sold in the wholesale trade on the basis of their flavor, it would seem that from a standpoint of the consumer this factor should be considered in deciding whether a crop should be picked or left on the tree. During cold storage for 2 months the flavor changed but little in fruits showing no pitting, whereas in fruits on the tree the acid decreased, soluble solids increased constantly, and the flavor became sweeter and more insipid.

Because storage behavior is not entirely predictable, it is very important that the condition of fruit in storage be followed closely. In commercial operations four or five boxes chosen at random from each carlot should be examined every 2 weeks during the storage period. If storage is extended longer than 2 months it would be advisable to remove a box occasionally and make observations on the amount of spoilage that occurs during a week at room temperature. Needless to say the fruit should be placed in trade channels when the first sign of extensive deterioration appears.

It is outside the scope of this paper to discuss the economic factors affecting the selling prices of midseason and late season Valencia oranges, although these factors must be considered in determining the advisability of storing fruit rather than selling it immediately after picking. One factor worth considering is that fruit stored at the terminal market has the advantage of being availpected upturns in the market occur.

(Both Dr. C. O. Bratley and J. R. Winston are connected with the Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture.)—Editor.

EDITORIAL

(Continued from page 10)

states.

At the present moment that seems to us to be a good idea. Havng tried about everything else, why not try that?

CLASSIFIED Advertisments

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion. Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

SCENIC HIGHWAY NURSERIES has a large stock of early and late grapefruit and oranges. One, two and three year buds. This nursery has been operated since 1888 by G. H. Gibbons, Waverly, Fla.

ALYCE CLOVER SEED. Ripe and cleaned. Ideal cover and hay crop, Write for information. P. E. Synder, Box 866, Lakeland, Fla.

WANTED — Two thousand sweet seedling root stock, lining-out or better. H. M. Sherwood, Fort Myers, Florida.

ROSES—Two year, fieldgrown, everblooming varieties. Fall planting best. Free catalog. Tytex Rose Nurseries, Tyler, Texas.

THRIFTY TREES and budwood from record performance Perrine Lemon parents. Persian Lime and other citrus varieties. DeSoto Nurseries, DeSoto City, Fla.

ALYCE CLOVER, the best legume for hay or covercrop. Write for information. Hardin Groves, Box 68, Lakeland, Fla.

SEEDS—ROUGH LEMON, SOUR ORANGE, CLEOPATRA. Pure, fresh, good germination. Also seedlings linecut size. De Soto Nurseries, DeSoto City, Fla.

CITRUS BUDS AND SEEDLINGS—Jaffa, Pineapple, Hamlin buds on Sour Stock. Sour Orange Seedlings.. R. P. Thornton and H. S. Pollard, Copothorn Nurseries, Box 2880, Tampa, Florida.

CITRUS SEEDLINGS
Cleopatra, Sweet Seedlings, Sour Orange, Rough Lemon, Grapefruit. New low prices. Grand Island Nurseries, Eustis, Fla.

HARDIN'S SPERRYOLA Lemon, a profitable adapted commercial variety for all sections. Hardy, prolific grower and producer. Limited number choice trees. Hardin Nurseries, Box 68, Lakeland, Fla.

SEED—Rough lemon, sour orange, cleopatra. New crop from type true parent trees. Also thrifty seedlings. DeSoto Nurseries, DeSoto City, Florida.

NEW COMMERCIAL lemon for Florida, the Perrine; proven. All residents need yard trees, keeping Florida money at home. Booking orders for budded stock for Winter delivery. DeSoto Nurseries, DeSoto City, Fla.

BUDDED trees new Florida commercial lemon, proven, thin skinned, juicy, scab immune. Also rough lemon, sour orange and Cleopatra seed and liningout seedlings. DeSoto Nurseries, DeSoto City, Fla.

AVOCADOS — All desirable varieties. Haden Mangos, Persian Limes, superior budded Loquats. Coral Reef Nurseries Co., Homestead, Florida.

ALYCE CLOVER
Fresh crop, cleaned, and inoculated. Also Crotalaria Spectabilis, Intermedia, Striata. Write for new low prices. Grand Island Nurseries, Eustis, Fla.

CHOICE Rough Lemon Seedlings 6 to 20 inches high, $10.00 per thousand. Olan Altman, Sebring, Florida.

CROTALARIA SPECTABILIS — Fresh crop, $15.00 per 100 lbs. f. o. b. Frostproof, Fla. Milton Woodley, Frostproof, Flo.

"MAIL ORDER Operator desires contact with grower of high grade avocado pears. Have interesting proposition for grower of highest quality fruit." F. R. Gardner, P. O. Box 528, Greenville, Pa.

FOR SALE—2000 Riverside No. 10 Grove Orchard Oil Heaters used only two seasons, excellent condition. 70c each, F.O.B. Marianna subject to prior sale. Marianna Fruit Company, Marianna, Fla.

CITRUS NURSERY TREES
All standard varieties and novelties, on Cleopatra and Sour Orange root. Grand Island Nurseries, Eustis, Fla.

MANURE — Stable and Dairy Manure in car lots. Write for prices. P. O. Box 2022, Jacksonville, Fla.

STANDARD varieties of citrus trees including Persian limes and Perrine lemons at reasonable prices. Ward's Nursery, Avon Park, Fla.

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JACKSONVILLE, FLORIDA

Some Observations On Improving Citrus Fruit

By J. J. Taylor
STATE CHEMIST, CHIEF CITRUS INSPECTION BUREAU

The observations I shall make on improving Florida citrus, based on several years experience in directing the Citrus Inspection Bureau of the Department of Agriculture, will not be confined entirely to the improvement of citrus itself; because that is only a part of the problem. Our whole problem is not only to improve our citrus but how to improve our methods of handling, processing and marketing our citrus.

In order to be justified in making observations on how to improve any industry, we must first assume that there is something wrong with that industry or at least something that could be improved.

In the case of the citrus industry, if anyone needs convincing, he will only have to look at the daily sales record for any day from the first of September until the present time and compare it with what it costs to grow fruit and deliver it to the market under present conditions; and I think he will be convinced. However, if you happen to be a grower, you can apply a simpler test—go to the nearest packing house or canning plant and ask how much they will give you for your fruit on the trees. The answer will convince the most skeptical that there certainly must be something wrong with the industry. Admitting then that there is room for improvement, how and where should we begin to bring about this condition? The fact is, there are so many things that need attention that it is most difficult to know where to begin.

After all, it is not very difficult to see what is the matter with the industry—it is the price the grower gets for his fruit. There is nothing the matter with the industry that a price of a "dollar a box" on the tree to the grower will not cure. The question is how to get that dollar for the grower.

Almost every year some new remedy is tried; they usually end up the same—in disagreement, failure and lower prices.

In making observations on the improvement of the citrus industry, I shall not attempt to touch on the question of marketing other than to say that it seems to be the most important and at the time the most uncontrollable part of our industry.

As to handling, processing, and packing of fruit, I will paraphrase a true and renowned saying concerning government that "The people who are the least governed are the best governed." I think it can just as truly be said of citrus fruit that the fruit which is the least handled and processed is the best handled and processed—but time does not permit my elaborating on these points.

I am supposed to offer observations on improving citrus and since this is quite a large subject, in itself, I shall confine my remarks to one type of citrus only and that is our largest crop—oranges. As for grapefruit, it seems that it is going to require a major operation on that industry to save it, and oranges are becoming almost as bad. A few years ago Florida could and did boast the finest flavored and juiciest oranges in the world. Florida can still boast the finest oranges in the world—if she waits until after the middle of December or the first of January to start boasting; but she will have few listeners among northern consumers when she sings the praises of the pale, thin, watery, early oranges that we ship them in September, October and November.

The effort to extend our shipping season is largely responsible for the disastrous condition of our early orange deal. Our shipping season has already been extended too far and in the wrong direction. If it had to be extended, it should have been extended further into the summer when the fruit is fully matured and will give consumers satisfaction rather than propagating early varieties that have little or no color or flavor, that are insipid and watery, and that must be kept in coloring rooms under gas many hours before the green color of the peel is bleached out enough that they can be shipped at all. We have not only extended our shipping season into a market already glutted with peaches, pears, berries, apples, melons and cantaloupes; but we have extended it by lowering the quality of our product to where it would not bring a price long on any market. Year after year, I have seen the market open with a price that would bring the grower

(Continued on page 15)

Give 'em
DOLOMITE
for
"Soil Heartburn"

ACID SOILS
affect the digestive systems and general health of citrus trees and truck crops exactly the same way that an acid stomach affects your digestion and health.

D-P DOLOMITE
corrects soil acidity, supplies needed calcium and magnesium, and increases the availability of other plant foods. Because D-P Dolomite does not raise soil pH above neutral, there is no risk of over-alkalizing. Use D-P Dolomite to get better results from your soil and your fertilizer.

IMPORTANT
If you are using Sulphate of Ammonia or other acid-tending fertilizers in an effort to economize this year, by all means precede or follow the application with D-P Dolomite in order to neutralize the acid and avoid dangerous "soil heartburn."

Write for FREE Booklet on "Soil Heartburn"

Dolomite Products, Inc.
Department - D
Ocala - - Florida

Armour's Active Plant Foods make your work count for more

The active plant foods in Armour's not only give your citrus and vegetables that extra push, getting them off to a good start, but stay with your crop carrying it to a healthy maturity.

Experienced users know that Armour's is a complete fertilizer with proven performance in the fields. And this is why so many successful growers specify it year after year.

Join the BIG CROP farmers this year and make every acre do its best toward producing quality crops and bigger profits with —

Armour's BIG CROP FERTILIZERS

Armour maintains a staff of competent field men, experienced in analyzing the fertilizer requirements of your crops and soil. A card to this office will bring the representative in your territory who will make valuable recommendations for increased profits.

ARMOUR FERTILIZER WORKS

Jacksonville, Florida